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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,934	04/12/2001	Suhail S. Saquib	8448/RMD	3221
20349	7590	08/15/2005	EXAMINER	
POLAROID CORPORATION PATENT DEPARTMENT 1265 MAIN STREET WALTHAM, MA 02451			AMINI, JAVID A	
			ART UNIT	PAPER NUMBER
			2672	

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/833,934

Applicant(s)

SAQUIB ET AL.

Examiner

Javid A. Amini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/16/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/12/2001.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Response to Arguments

Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

Figure 7 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. See figs. 6a and 7 of the reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10 rejected under 35 U.S.C. 103(a) as being unpatentable over Rashkovskiy et al. (hereinafter refers as Rashkovskiy.

1. Claim 1,

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Rashkovskiy illustrates the following claim limitations in fig. 2. A method for electronically capturing and processing image information comprising the steps of: Rashkovskiy in fig. 2 illustrates a block diagram of a digital camera having a color filter image stored in a memory. Digital Camera 10 uses Lens 12 to accept light from the environment around the camera. The light passes through and is filtered by Color Filter Array 13 and is sensed by electronics Sensors 14. The resulting Color Filter Image 16 is stored in Memory 18. - The Sensors may be CCDs, CMOS arrays, or other light sensing devices. The Color Filter Image is a representation of the image sensed by the camera, see claim limitations in following section: (a) providing a two-dimensional array (A single-chip color filter array is a two-dimensional grid of picture elements, called pixels, covered by color filters. Each pixel is typically implemented through the use of a charge-coupled device (CCD) or CMOS circuit) of discrete image sensing elements, each discrete element capable of providing an electronic information signal in response to incident illumination, said electronic information signal corresponding to the intensity of said incident illumination, each discrete element being specifically responsive to one of at least three predetermined colors; (b) obtaining first color image data by exposing the two-dimensional array to image-information bearing illumination such that each discrete element provides said electronic information signal, said first color image data comprising the collection of said electronic information signals. The following limitations have been shown by Rashkovskiy at col. 4, lines 23-47 (c) recovering missing color information along a first dimension by (i) interpolating the first color image data along said first dimension to provide first-interpolated color data, Rashkovskiy in col. 4, lines 28-31 discloses that the embodiment of the invention, green pixels are sampled along diagonals instead of the conventional approach along rows and

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columns in the Color Filter Array, as current application claiming. (ii) forming a first difference channel between said first color image data and said first-interpolated color data, (iii) applying a first one-dimensional non-linear filter (Rashkovskiy in col. 4 line 44 discloses a cubic B-spline filter, i.e. considers a non-linear filter)) said first difference channel, whereby the first-recovered image data is obtained as combination of the first color image data and filtered first difference channel, and forming second color data comprising the first color data and the first-recovered color data. Rashkovskiy in col. 4 lines 47-67 discloses the determination of the missing red and blue values of Step 102 of FIG. 3 can be illustrated by several examples using FIGS. 4a and 4b to indicate pixel positions in the Bayer pattern. The missing red value for the pixel at the first row of the second column, denoted $R_{sub.12}$ is computed according to the present invention as $(R_{sub.11} + R_{sub.13})/2 + (G_{sub.12} - (G_{sub.11} + G_{sub.13})/2)$. The first term of the equation (referencing the adjacent red values) is called the interpolation term. This term is the linear interpolation of the neighboring red values. The second term (referencing the green values) is called the luminance correction term. This term represents the difference between green at the location of the interpolated value of red and green at the locations of measured red values used in the interpolation calculation. The luminance correction terms use results obtained from the green interpolation calculations of Step 100 of FIG. 3. The missing red value for the pixel at the second row of the first column, denoted $R_{sub.21}$, is computed as $(R_{sub.11} + R_{sub.31})/2 + (G_{sub.21} - (G_{sub.11} + G_{sub.31})/2)$. The missing red value for the pixel at the second row of the second column, denoted $R_{sub.22}$, is computed as $(R_{sub.11} + R_{sub.13} + R_{sub.31} + R_{sub.33})/4 + (G_{sub.22} - (G_{sub.11} + G_{sub.13} + G_{sub.31} + G_{sub.33})/4)$. Note that red values bordering edges of the image are determined by reference to only two adjacent red

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pixels; otherwise four diagonally adjacent red pixels are used for the interpolation term. In a similar manner, missing blue values are computed. The missing blue value for the pixel at the second row of the third column, denoted B.sub.23, is computed according to the present invention as $(B.sub.22 + B.sub.24)/2 + (G.sub.23 - (G.sub.22 + G.sub.24)/2)$. The missing blue value for the pixel at the third row of the second column, denoted B.sub.32, is computed as $(B.sub.22 + B.sub.42)/2 + (G.sub.32 - (G.sub.22 + G.sub.42)/2)$. The missing blue value for the pixel at the third row of the third column, denoted B.sub.33 is computed as $(B.sub.22 + B.sub.24 + B.sub.42 + B.sub.44)/4 + (G.sub.22 - (G.sub.11 + G.sub.13 + G.sub.31 + G.sub.33)/4)$. Note that blue values bordering edges of the image are determined by reference to only two adjacent blue pixels; otherwise four diagonally adjacent blue pixels are used for the interpolation term. The following step of claim 1 is similar to the step of (c), because the step of (c) is processing rows' data and step (d) is processing columns' data. (d) recovering missing color information along second dimension by interpolating the second color image data along said second dimension to provide second interpolated color data, forming a second difference channel between said second color image data and said second interpolated color data, applying second one-dimensional non-linear filter to said second difference channel, whereby the second-recovered color data obtained as combination the second color data and the filtered second difference channel, and forming final recovered image data comprising the second color data and the second recovered color data. Rashkovskiy does not process the missing data as rows and columns. However, Rashkovskiy discloses in col. 4, line 30 that the conventional approach is along rows and columns in the Color Filter Array. The claim invention also does not explicitly specify processing of missing data along rows and columns. The reference teaches of cubic B-spline filters (i.e. considered as a non-

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linear filter) and in fig. 7 illustrates 17 rows by 17 columns, which is similar to what the specification discloses in fig. 7 of the current application. This modification of the processing of missing color from diagonally method into rows and columns method would have been obvious to one of ordinary skill in the art at the time the invention was made.

2. Claim 2

See rejection of the claim 1.

3. Claims 3 and 8

The method of claim 2, wherein said first and second one-dimensional non-linear filters are rank-order filters. Rashkovskiy in cols. 9-10 or appendix A shows rank-order filters.

4. Claims 4 and 9

The method of claim 3, wherein each discrete element is responsive to one of three predetermined colors, the three predetermined colors being a color substantially within the red wavelengths, a color substantially within the green wavelengths, and a color substantially within the blue wavelengths. Rashkovskiy in col. 3, lines 33-37 discloses three colors of information should be displayed at every pixel. Therefore, image reconstruction processing is used to create three-color information at every pixel of the display.

5. Claims 5 and 10

The method claim wherein each discrete element is responsive one of three predetermined colors, the three predetermined colors being color substantially within a combination the red and green wavelengths, a color substantially within combination of the green and blue wavelengths, and color substantially within a combination of the red and blue wavelengths. Rashkovskiy in col. 2, lines 42-46 under description of related art discloses the difference between red and green

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at red pixel locations to interpolate missing red values, and the difference between blue and green at blue pixel locations to interpolate missing blue values.

6. Claims 6 and 7

See rejection of claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javid A. Amini whose telephone number is 571-272-7654. The examiner can normally be reached on 8-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Javid Amini

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Examiner
Art Unit 2672



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